

REMARKS

This Amendment is responsive to the June 30, 2008 Office Action. Claims 1-6 stand rejected. Claim 1 has been amended to add clarifying language in accordance with the originally-filed specification and drawings. Support for the amendment to claim 1 may be found, for example, in the specification at page 5, lines 1-3; page 6, lines 2-8; page 10, lines 4-12; and page 4, lines 23-28.

Rejections Under 35 U.S.C. §103

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) for obviousness over United States Patent No. 6,428,243 to Hutchins in view of United States Patent No. 4,509,889 to Skogberg et al. In view of the foregoing amendments and the following comments, reconsideration of this rejection is respectfully requested.

Amended claim 1 recites, *inter alia*, “a rockbolt main body and a pressurized-fluid-introducing sleeve fixed by welding to the rockbolt main body at an end for introduction of a pressurized fluid, wherein the rockbolt main body is configured to hydraulically expand upon the introduction of the pressurized fluid, the pressurized-fluid introducing sleeve comprising a projecting part with an outer diameter larger than a diameter of an aperture of a bearing plate and a pressurized-fluid-introducing hole, and a bearing-plate-holding part with an outer diameter smaller than the diameter of the aperture of the bearing plate, whereby the bearing plate is held in contact with a step between the projecting part and the bearing-plate-holding part, the projecting part and the bearing-plate-holding part are formed in series . . . ”.

Accordingly, as discussed in the specification at page 2, line 27 to page 3, line 4, the present invention provides an expansive rockbolt having a pressurized-fluid-introducing sleeve partially inserted in a rockbolt-setting hole of bedrock or ground in order to decrease a height of the sleeve projecting from a sprayed concrete layer. Due to the decrease in the projection height, a lining concrete layer is prevented from thickness deviation and cracking, and breaking of waterproof sheet as well as breakdown of deformed pipe near welded part when pressurized and expanded can also be prevented so that the bedrock or ground can be firmly reinforced with high reliability.

Therefore, the rockbolt of the present invention has a pressurized-fluid-introducing sleeve with the structure that a large-diameter part and a small-diameter part are formed in series. The small-diameter part is inserted into a bearing plate and placed in a rockbolt-setting hole of bedrock or ground. The large-diameter part only projects outwards from a sprayed concrete layer, so as to limit a projection height. In particular, as shown in Fig. 4, a pressurized-fluid-introducing sleeve 10 for introduction of a pressurized fluid comprises a cylindrical projecting part 11 and a bearing-plate-holding part 12. The projecting part 11 has an outer diameter larger than an aperture of a bearing plate 6, while the bearing-plate-holding part 12 has an outer diameter smaller than the aperture of the bearing plate 6.

The Hutchins patent is directed to a cable bolt (10) having a plurality of wires (11). The end of the cable bolt is terminated with a sleeve (17) having a threaded external surface for receiving a lock nut (18) to tension the bolt against a bearing plate (19). The bearing plate has a "trumpet" portion (20) welded to the bearing plate (19) and extending into a bore hole (21). The lock nut (18) includes a bore (24) that connects to a tube (26) for the introduction of a grout mix.

In use, the cable bolt of the Hutchins patent is installed in the roof of a mine by drilling a stepped bore hole (21) in the mine roof to the required length. Next, a two part resin adhesive in separate plastic packs (39, 40, and 41) is placed in the hole and is pushed upwardly to the top of the hole by insertion of the cable bolt (10). When the resin has reached the inner end (42) of the hole, further insertion of the cable bolt fractures the packaging and the two parts of the resin are allowed to mix and react with each other. The resin is quick curing and the cable bolt is then secured in the bore hole (21) at the upper end (42) and the lock nut (18) is tightened to force the bearing plate (19) against the mine roof. Further, if the cable bolt is to be grouted over its entire length, grouting is pumped via the grout tube (26) until it fills the bore hole and all the spaces surrounding the strands (11) up to the resin seal (29).

The Skogberg patent is relied upon in the Office Action at page 2 to teach a rockbolt main body that is configured to hydraulically expand upon the introduction of pressurized fluid. The Skogberg patent discloses an expandable tube-type rockbolt having an outer strengthening sleeve (19) threaded along its entire length so that a plate (41) can be

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clamped against the rock by means of a nut (42). A fitting (24) projects from the end of the sleeve (19) to supply high pressure water.

The Hutchins patent and the Skogberg patent fail to teach or suggest a pressurized-fluid-introducing sleeve comprising a projecting part with an outer diameter larger than a diameter of an aperture of a bearing plate and a bearing-plate-holding part with an outer diameter smaller than the diameter of the aperture of the bearing plate, whereby the bearing plate is held in contact with a step between the projecting part and the bearing-plate-holding part and the projecting part and the bearing-plate-holding part are formed in series. The “trumpet” portion (20) of the Hutchins patent is welded to the side of the bearing plate (19) and the lock nut (18) is threaded onto the sleeve (17) extending through the bearing plate (19). Thus, the “trumpet” portion (20) of the Hutchins patent fails to disclose a bearing-plate-holding part with an outer diameter smaller than the diameter of the aperture of the bearing plate such that the bearing plate is held in contact with a step between the projecting part and the bearing-plate-holding part with the projecting part and the bearing-plate-holding part being formed in series. The sleeve (19) of the Skogberg patent fails to overcome the deficiencies of the Hutchins patent. Therefore, the combination of the Hutchins patent and the Skogberg patent fails to teach or suggest all of the limitations of amended independent claim 1.

Furthermore, Applicants respectfully submit that one of ordinary skill in the art would not modify the Hutchins patent by substituting the rockbolt arrangement of the Skogberg for the rockbolt arrangement of the Hutchins patent as asserted in the Office Action at page 3. As discussed above, the Hutchins patent achieves reinforcement of the walls by tensioning wire threads using resin and the rockbolt of the Skogberg patent achieves reinforcement through hydraulic expansion. Thus, modifying the tensioned bolt of the Hutchins patent with the hydraulically expanded bolt of the Skogberg patent is not merely substituting one known element for another to achieve predictable results as asserted in the Office Action. Such a modification seeks to combine two references with different methods for securing the bolt within a bore hole, which would completely change how the bolt of the Hutchins patent operates. Therefore, for this additional reason, the combination of the Hutchins patent and the Skogberg patent fails to render independent claim 1 obvious.

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Claims 2-6 depend from and add further limitations to independent claim 1. Thus, claims 2-6 are deemed to be in condition for allowance for all of the reasons set forth hereinabove.

In view of the foregoing amendment and comments, Applicants respectfully request reconsideration of the rejection of claims 1-6 and allowance of the same.

Respectfully submitted,
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